

CLAIMS

1 A method for estimating a reverse link maximum data rate,
2 comprising:

3 determining at a source of data a quality metric of a link over which data
4 is to be transmitted;

5 modifying said quality metric by a quality metric margin; and

6 determining a maximum rate of data in accordance with said modified
quality metric.

2 The method as claimed in claim 1, further comprising:
2 processing said quality metric by a predictor.

3 The method as claimed in claim 2, wherein said processing said
2 quality metric by a predictor comprises:

filtering said quality metric by a linear filter.

4 The method as claimed in claim 2, wherein said processing said
2 quality metric by a predictor comprises:

filtering said quality metric by a non-linear filter.

5 The method as claimed in claim 4, wherein said filtering said
2 quality metric by a non-linear filter comprises:

filtering said quality metric by a peak filter.

6 The method as claimed in claim 1, wherein said determining at a
2 source of data a quality metric of a link over which data is to be transmitted
comprises:

4 receiving at a source of data at least one signal; and

5 determining said quality metric in accordance with the received at least
6 one signal.

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7 The method as claimed in claim 1, wherein said determining at a
2 source of data a quality metric of a link over which data is to be transmitted
comprises:

4 receiving at a source of data at least one first reference signal; and
determining said quality metric in accordance with the received at least
6 one first reference signal and the at least one first reference signal.

8 The method as claimed in claim 1, wherein said determining at a
2 source of data a quality metric of a link over which data is to be transmitted
comprises:

4 receiving at a source of data a feedback signal; and
determining the quality metric in accordance with the received feedback
6 signal.

9 The method as claimed in claim 1, wherein said determining at a
2 source of data a quality metric of a link over which data is to be transmitted
comprises:

4 receiving at a source of data at least one signal;
receiving at a source of data a feedback signal; and
6 determining said quality metric in accordance with the received at least
one signal and the received feedback signal.

10 The method as claimed in claim 1, wherein said determining at a
2 source of data a quality metric of a link over which data is to be transmitted
comprises:

4 receiving at a source of data a reference signal;
receiving at a source of data a feedback signal; and
6 determining the quality metric in accordance with the reference signal,
the received reference signal, and the received feedback signal.

11 The method as claimed in claim 1, wherein said modifying the
2 quality metric by a quality metric margin comprises:

modifying the quality metric by a pre-determined quality metric margin.

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12. The method as claimed in claim 1, wherein said modifying said
2 quality metric by a quality metric margin comprises:

4 declaring an outage event when power required for transmission of a
second reference signal exceeds power required for transmission of the second
reference signal determined from previously modified quality metric;

6 detecting occurrence of the outage event during a pre-determined
interval; and

8 modifying said quality metric in accordance with said detecting.

13. The method as claimed in claim 12, wherein said modifying said
2 quality metric in accordance with said detecting comprises:

4 increasing a current quality metric margin by a first amount when a pre-
determined number of the outage events occurred during the pre-determined
interval; and

6 modifying said quality metric by said increased quality metric margin.

14. The method as claimed in claim 13, further comprising:

2 decreasing a current quality metric margin by a second amount when the
pre-determined number of the outage events did not occur during the pre-
4 determined interval; and

modifying said quality metric by said decreased quality metric margin.

15. The method as claimed in claim 1, wherein said modifying said
2 quality metric by a quality metric margin comprises:

4 declaring an outage event when power required for transmission of data
at the estimated rate of data exceeds maximum allowable transmission power;

6 detecting occurrence of the outage event during a pre-determined
interval; and

modifying said quality metric in accordance with said detecting.

16. The method as claimed in claim 15, wherein said modifying said
2 quality metric in accordance with said detecting comprises:

4 increasing a current quality metric margin by a first amount when a pre-
determined number of outages occurred during the pre-determined interval; and

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modifying said quality metric by said increased quality metric margin.

17. The method as claimed in claim 16, further comprising:

- 2 decreasing a current quality metric margin by a second amount when the
pre-determined number of outages did not occur during the pre-determined
4 interval; and
modifying said quality metric by said decreased quality metric margin.

18. The method as claimed in claim 16, wherein said increasing a
2 current quality metric margin by a first amount when a pre-determined number
of outages occurred during the pre-determined interval comprises:

- 4 determining whether the estimated rate of data has changed to a
maximum allowable rate of data;
6 setting a quality metric lower limit to the current value of the quality
metric; and
8 increasing the quality metric by a first value when a pre-determined
number of outages occurred during the pre-determined interval.

19. The method as claimed in claim 18, further comprising:

- 2 decreasing the power margin by a second value if said resulting
decreased power margin is greater than the lower limit of the power margin; and
4 setting the power margin equal to the lower limit of the power margin
otherwise.

20. The method as claimed in claim 16, wherein said decreasing a
2 current quality metric margin by a second amount when the pre-determined
number of outages did not occur during the pre-determined interval; comprises:

- 4 determining whether the estimated rate of data has changed to a
minimum allowable rate of data;
6 setting a quality metric upper limit to the current value of the quality
metric; and
8 decreasing the quality metric by a second value when a pre-determined
number of outages occurred during the pre-determined interval.

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21. The method as claimed in claim 20, further comprising:
2 increasing the power margin by a first value if said resulting increased
power margin is less than the lower limit of the power margin; and
4 setting the power margin equal to the lower limit of the power margin
otherwise.

22. The method as claimed in claim 16, wherein said increasing a
2 current quality metric margin by a first amount when a pre-determined number
of outages occurred during the pre-determined interval comprises:
4 determining whether the estimated rate of data is equal to a maximum
allowable rate of data; and
6 increasing the quality metric by a first value when a pre-determined
number of outages occurred during the pre-determined interval.

23. The method as claimed in claim 22, further comprising:
2 unchanging the power margin when a pre-determined number of outages
did not occur during the pre-determined interval.

24. The method as claimed in claim 16, wherein said decreasing a
2 current quality metric margin by a second amount when the pre-determined
number of outages did not occur during the pre-determined interval; comprises:
4 determining whether the estimated rate of data is equal to a minimum
allowable rate of data; and
6 decreasing the quality metric by a second value when a pre-determined
number of outages did not occur during the pre-determined interval.

25. The method as claimed in claim 20, further comprising:
2 leaving the power margin unchanged when a pre-determined number of
outages occurred during the pre-determined interval.

26. The method as claimed in claim 1, wherein said determining a
2 maximum rate of data in accordance with the modified quality metric comprises:
determining a transmission power in accordance with the modified quality
4 metric; and

selecting a data rate whose said determined transmission power does
6 not exceed maximum allowable transmission power.

27. A method for detecting an outage, comprising:
2 determining at a source of data a quality metric of a link over which data
is to be transmitted;
4 modifying said quality metric by a quality metric margin; and
declaring an outage event when power required for transmission of a
6 reference signal exceeds power required for transmission of the reference
signal determined from the modified quality metric.

28. A method for detecting an outage, comprising:
2 determining at a source of data a quality metric of a link over which data
is to be transmitted;
4 modifying said quality metric by a quality metric margin;
determining a maximum rate of data in accordance with said modified
6 quality metric.
declaring an outage event when power required for transmission of data
8 at the maximum rate of data exceeds maximum allowable transmission power.

29. A method for estimating power required for transmission of a data,
2 comprising:
determining at a source of data a quality metric of a link over which data
4 is to be transmitted;
modifying said quality metric by a quality metric margin; and
6 determining power required for transmission of a data in accordance with
said modified quality metric and a rate of the data.

30. The method as claimed in claim 29, further comprising:
2 processing said quality metric by a predictor.

31. The method as claimed in claim 30, wherein said processing said
2 quality metric by a predictor comprises:
filtering said quality metric by a linear filter.

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32. The method as claimed in claim 30, wherein said processing said
2 quality metric by a predictor comprises:
filtering said quality metric by a non-linear filter.

33. The method as claimed in claim 32, wherein said filtering said
2 quality metric by a non-linear filter comprises:
filtering said quality metric by a peak filter.

34. The method as claimed in claim 29, wherein said determining at a
2 source of data a quality metric of a link over which data is to be transmitted
comprises:
4 receiving at a source of data at least one signal; and
determining said quality metric in accordance with the received at least
6 one signal.

35. The method as claimed in claim 29, wherein said determining at a
2 source of data a quality metric of a link over which data is to be transmitted
comprises:
4 receiving at a source of data at least one first reference signal; and
determining said quality metric in accordance with the received at least
6 one first reference signal and the at least one first reference signal.

36. The method as claimed in claim 29, wherein said determining at a
2 source of data a quality metric of a link over which data is to be transmitted
comprises:
4 receiving at a source of data a feedback signal; and
determining the quality metric in accordance with the received feedback
6 signal.

37. The method as claimed in claim 29, wherein said determining at a
2 source of data a quality metric of a link over which data is to be transmitted
comprises:
4 receiving at a source of data at least one signal;

- receiving at a source of data a feedback signal; and
- 6 determining said quality metric in accordance with the received at least one signal and the received feedback signal.

38. The method as claimed in claim 29, wherein said determining at a
2 source of data a quality metric of a link over which data is to be transmitted comprises:

- 4 receiving at a source of data a first reference signal;
receiving at a source of data a feedback signal; and
- 6 determining the quality metric in accordance with the first reference signal, the received first reference signal, and the received feedback signal.

39. The method as claimed in claim 29, wherein said modifying the
2 quality metric by a quality metric margin comprises:

modifying the quality metric by a pre-determined quality metric margin.

40. The method as claimed in claim 29, wherein said modifying said
2 quality metric by a quality metric margin comprises:

declaring an outage event when power required for transmission of a
4 second reference signal exceeds power required for transmission of the second reference signal determined from previously modified quality metric;

6 detecting occurrence of the outage event during a pre-determined interval; and

8 modifying said quality metric in accordance with said detecting.

41. The method as claimed in claim 40, wherein said modifying said
2 quality metric in accordance with said detecting comprises:

increasing a current quality metric margin by a first amount when a pre-
4 determined number of the outage events occurred during the pre-determined interval; and

6 modifying said quality metric by said increased quality metric margin.

42. The method as claimed in claim 41, further comprising:

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- 2 decreasing a current quality metric margin by a second amount when the
pre-determined number of the outage events did not occur during the pre-
4 determined interval; and
modifying said quality metric by said decreased quality metric margin.

43. The method as claimed in claim 29, wherein said modifying said
2 quality metric by a quality metric margin comprises:
declaring an outage event when power required for transmission of data
4 at the estimated rate of data exceeds maximum allowable transmission power;
detecting occurrence of the outage event during a pre-determined
6 interval; and
modifying said quality metric in accordance with said detecting.

44. The method as claimed in claim 43, wherein said modifying said
2 quality metric in accordance with said detecting comprises:
increasing a current quality metric margin by a first amount when a pre-
4 determined number of outages occurred during the pre-determined interval; and
modifying said quality metric by said increased quality metric margin.

45. The method as claimed in claim 44, further comprising:
decreasing a current quality metric margin by a second amount when the
pre-determined number of outages did not occur during the pre-determined
interval; and
modifying said quality metric by said decreased quality metric margin.

46. An apparatus for estimating a reverse link maximum data rate,
2 comprising:
means for determining at a source of data a quality metric of a link over
4 which data is to be transmitted;
means for modifying said quality metric by a quality metric margin; and
6 means for determining a maximum rate of data in accordance with said
modified quality metric.

47. The apparatus as claimed in claim 46, further comprising:

2 means for processing said quality metric by a predictor.

48. The apparatus as claimed in claim 47, wherein said means for
2 processing said quality metric by a predictor comprises:

means for filtering said quality metric by a linear filter.

49. The apparatus as claimed in claim 47, wherein said means for
2 processing said quality metric by a predictor comprises:

means for filtering said quality metric by a non-linear filter.

50. The apparatus as claimed in claim 49, wherein said means for filtering
2 said quality metric by a non-linear filter comprises:

means for filtering said quality metric by a peak filter.

51. The apparatus as claimed in claim 46, wherein said means for
2 determining at a source of data a quality metric of a link over which data is to be
transmitted comprises:

4 means for receiving at a source of data at least one signal; and

6 means for determining said quality metric in accordance with the
received at least one signal.

52. The apparatus as claimed in claim 46, wherein said means for
2 determining at a source of data a quality metric of a link over which data is to be
transmitted comprises:

4 means for receiving at a source of data at least one first reference signal;
and

6 means for determining said quality metric in accordance with the
received at least one first reference signal and the at least one first reference
8 signal.

53. The apparatus as claimed in claim 46, wherein said
2 means for determining at a source of data a quality metric of a link over which
data is to be transmitted comprises:

4 means for receiving at a source of data a feedback signal; and

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means for determining the quality metric in accordance with the received
6 feedback signal.

54. The apparatus as claimed in claim 46, wherein said means for
2 determining at a source of data a quality metric of a link over which data is to be
transmitted comprises:

4 means for receiving at a source of data at least one signal;

means for receiving at a source of data a feedback signal; and

6 means for determining said quality metric in accordance with the
received at least one signal and the received feedback signal.

55. The apparatus as claimed in claim 46, wherein said means for
2 determining at a source of data a quality metric of a link over which data is to be
transmitted comprises:

4 means for receiving at a source of data a first reference signal;

means for receiving at a source of data a feedback signal; and

6 means for determining the quality metric in accordance with the first
reference signal, the received first reference signal, and the received feedback
8 signal.

56. The apparatus as claimed in claim 46, wherein said means for modifying
2 the quality metric by a quality metric margin comprises:

means for modifying the quality metric by a pre-determined quality metric
4 margin.

57. The apparatus as claimed in claim 46, wherein said means for
2 modifying said quality metric by a quality metric margin comprises:

means for declaring an outage event when power required for
4 transmission of a second reference signal exceeds power required for
transmission of the second reference signal determined from previously
6 modified quality metric;

means for detecting occurrence of the outage event during a pre-
8 determined interval; and

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6 means for modifying said quality metric by said increased quality metric
margin.

62. The apparatus as claimed in claim 61, further comprising:

2 means for decreasing a current quality metric margin by a second
amount when the pre-determined number of outages did not occur during the
4 pre-determined interval; and

means for modifying said quality metric by said decreased quality metric
6 margin.

63. The apparatus as claimed in claim 61, wherein said means for increasing
2 a current quality metric margin by a first amount when a pre-determined number
of outages occurred during the pre-determined interval comprises:

4 means for determining whether the estimated rate of data has changed
to a maximum allowable rate of data;

6 means for setting a quality metric lower limit to the current value of the
quality metric; and

8 means for increasing the quality metric by a first value when a pre-
determined number of outages occurred during the pre-determined interval.

64. The apparatus as claimed in claim 63, further comprising:

2 means for decreasing the power margin by a second value if said
resulting decreased power margin is greater than the lower limit of the power
4 margin; and

means for setting the power margin equal to the lower limit of the power
6 margin otherwise.

65. The apparatus as claimed in claim 62, wherein said means for
2 decreasing a current quality metric margin by a second amount when the pre-
determined number of outages did not occur during the pre-determined interval;
4 comprises:

means for determining whether the estimated rate of data has changed
6 to a minimum allowable rate of data;

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means for setting a quality metric upper limit to the current value of the
8 quality metric; and

means for decreasing the quality metric by a second value when a pre-
10 determined number of outages occurred during the pre-determined interval.

66. The apparatus as claimed in claim 65, further comprising:

2 means for increasing the power margin by a first value if said resulting
increased power margin is less than the lower limit of the power margin; and

4 means for setting the power margin equal to the lower limit of the power
margin otherwise.

67. The apparatus as claimed in claim 61, wherein said means for increasing
2 a current quality metric margin by a first amount when a pre-determined number
of outages occurred during the pre-determined interval comprises:

4 means for determining whether the estimated rate of data is equal to a
maximum allowable rate of data; and

6 means for increasing the quality metric by a first value when a pre-
determined number of outages occurred during the pre-determined interval.

68. The apparatus as claimed in claim 67, further comprising:

2 means for leaving the power margin unchanged when a pre-determined
number of outages did not occur during the pre-determined interval.

69. The apparatus as claimed in claim 61, wherein said means for
2 decreasing a current quality metric margin by a second amount when the pre-
determined number of outages did not occur during the pre-determined interval;
4 comprises:

means for determining whether the estimated rate of data is equal to a
6 minimum allowable rate of data; and

means for decreasing the quality metric by a second value when a pre-
8 determined number of outages did not occur during the pre-determined interval.

70. The apparatus as claimed in claim 69, further comprising:

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71. The apparatus as claimed in claim 46, wherein said means for
2 determining a maximum rate of data in accordance with the modified quality
metric comprises:

6 means for selecting a data rate whose said determined transmission power does not exceed maximum allowable transmission power.

72. An apparatus for detecting an outage, comprising:

2 means for determining at a source of data a quality metric of a link over which data is to be transmitted;

4 means for modifying said quality metric by a quality metric margin; and

6 means for declaring an outage event when power required for transmission of a reference signal exceeds power required for transmission of the reference signal determined from the modified quality metric.

73. An apparatus for detecting an outage, comprising:

2 means for determining at a source of data a quality metric of a link over which data is to be transmitted;

4 means for modifying said quality metric by a quality metric margin;

means for determining a maximum rate of data in accordance with said

6 modified quality metric.

means for declaring an outage event when power required for
8 transmission of data at the maximum rate of data exceeds maximum allowable
transmission power.

74. An apparatus for estimating power required for transmission of a data,
2 comprising:
means for determining at a source of data a quality metric of a link over
4 which data is to be transmitted;
means for modifying said quality metric by a quality metric margin; and

6 means for determining power required for transmission of a data in
accordance with said modified quality metric and a rate of the data.

75. The apparatus as claimed in claim 74, further comprising:
2 means for processing said quality metric by a predictor.

76. The apparatus as claimed in claim 75, wherein said means for
2 processing said quality metric by a predictor comprises:
means for filtering said quality metric by a linear filter.

77. The apparatus as claimed in claim 75, wherein said means for
2 processing said quality metric by a predictor comprises:
means for filtering said quality metric by a non-linear filter.

78. The apparatus as claimed in claim 77, wherein said means for filtering
2 said quality metric by a non-linear filter comprises:
means for filtering said quality metric by a peak filter.

79. The apparatus as claimed in claim 74, wherein said means for
2 determining at a source of data a quality metric of a link over which data is to be
transmitted comprises:
4 means for receiving at a source of data at least one signal; and
means for determining said quality metric in accordance with the
6 received at least one signal.

80. The apparatus as claimed in claim 74, wherein said means for
2 determining at a source of data a quality metric of a link over which data is to be
transmitted comprises:
4 means for receiving at a source of data at least one first reference signal;
and
6 means for determining said quality metric in accordance with the
received at least one first reference signal and the at least one first reference
8 signal.

81. The apparatus as claimed in claim 74, wherein said means for
2 determining at a source of data a quality metric of a link over which data is to be
transmitted comprises:

4 means for receiving at a source of data a feedback signal; and
means for determining the quality metric in accordance with the received
6 feedback signal.

82. The apparatus as claimed in claim 74, wherein said means for
2 determining at a source of data a quality metric of a link over which data is to be
transmitted comprises:

4 means for receiving at a source of data at least one signal;
means for receiving at a source of data a feedback signal; and
6 means for determining said quality metric in accordance with the
received at least one signal and the received feedback signal.

83. The apparatus as claimed in claim 74, wherein said means for
2 determining at a source of data a quality metric of a link over which data is to be
transmitted comprises:

4 means for receiving at a source of data a first reference signal;
means for receiving at a source of data a feedback signal; and
6 means for determining the quality metric in accordance with the first
reference signal, the received first reference signal, and the received feedback
8 signal.

84. The apparatus as claimed in claim 74, wherein said means for modifying
2 the quality metric by a quality metric margin comprises:

means for modifying the quality metric by a pre-determined quality metric
4 margin.

85. The apparatus as claimed in claim 74, wherein said means for modifying
2 said quality metric by a quality metric margin comprises:

means for declaring an outage event when power required for
4 transmission of a second reference signal exceeds power required for

transmission of the second reference signal determined from previously
6 modified quality metric;

means for detecting occurrence of the outage event during a pre-
8 determined interval; and

means for modifying said quality metric in accordance with said
10 detecting.

86. The apparatus as claimed in claim 85, wherein said means for modifying
2 said quality metric in accordance with said detecting comprises:

means for increasing a current quality metric margin by a first amount
4 when a pre-determined number of the outage events occurred during the pre-
determined interval; and

6 means for modifying said quality metric by said increased quality metric
margin.

87. The apparatus as claimed in claim 86, further comprising:

2 means for decreasing a current quality metric margin by a second
amount when the pre-determined number of the outage events did not occur
4 during the pre-determined interval; and

means for modifying said quality metric by said decreased quality metric
6 margin.

88. The apparatus as claimed in claim 74, wherein said means for modifying
2 said quality metric by a quality metric margin comprises:

means for declaring an outage event when power required for
4 transmission of data at the estimated rate of data exceeds maximum allowable
transmission power;

6 means for detecting occurrence of the outage event during a pre-
determined interval; and

8 means for modifying said quality metric in accordance with said
detecting.

89. The apparatus as claimed in claim 88, wherein said means for modifying
2 said quality metric in accordance with said detecting comprises:

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means for increasing a current quality metric margin by a first amount
4 when a pre-determined number of outages occurred during the pre-determined
interval; and

6 means for modifying said quality metric by said increased quality metric
margin.

90. The apparatus as claimed in claim 89, further comprising:

2 means for decreasing a current quality metric margin by a second
amount when the pre-determined number of outages did not occur during the
4 pre-determined interval; and

means for modifying said quality metric by said decreased quality metric
6 margin.

91. An apparatus for estimating a reverse link maximum data rate,
2 comprising:

an estimator configured to determine at a source of data a quality metric
4 of a link over which data is to be transmitted;

a combiner communicatively coupled to said estimator configured to
6 modify the quality metric by a quality metric margin; and

a processing block communicatively coupled to said combiner configured
8 to determine a maximum rate of data in accordance with the modified quality
metric.

92. The apparatus as claimed in claim 91, wherein said estimator comprises
2 a predictor.

93. The apparatus as claimed in claim 92, wherein said predictor comprises
2 a linear filter.

94. The apparatus as claimed in claim 92, wherein said predictor comprises
2 a non-linear filter.

95. The apparatus as claimed in claim 94, wherein said non-linear filter
2 comprises a peak filter.

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96. The apparatus as claimed in claim 91, wherein said estimator comprises
2 an open loop estimator.

97. The apparatus as claimed in claim 91, wherein said estimator comprises
2 a closed loop estimator.

98. The apparatus as claimed in claim 91, wherein said estimator comprises:
2 an open loop estimator;
a closed loop estimator; and
4 a combiner communicatively coupled to said open loop estimator and a
open loop estimator.

99. The apparatus as claimed in claim 91, further comprising an outage
2 event detector communicatively coupled to said combiner.

100. A apparatus for estimating power required for transmission of a data,
2 comprising:

an estimator configured to determine at a source of data a quality metric
4 of a link over which data is to be transmitted;

a combiner communicatively coupled to said estimator configured to
6 modify the quality metric by a quality metric margin; and

a processing block communicatively coupled to said combiner configured
8 to determine power required for transmission of a data in accordance with said
modified quality metric and a rate of the data.

101. The apparatus as claimed in claim 100, wherein said estimator
2 comprises a predictor.

102. The apparatus as claimed in claim 101, wherein said predictor comprises
2 a linear filter.

103. The apparatus as claimed in claim 101, wherein said predictor comprises
2 a non-linear filter.

104. The apparatus as claimed in claim 103, wherein said non-linear filter
2 comprises a peak filter.

105. The apparatus as claimed in claim 100, wherein said estimator
2 comprises an open loop estimator.

106. The apparatus as claimed in claim 100, wherein said estimator
2 comprises a closed loop estimator.

107. The apparatus as claimed in claim 100, wherein said estimator
2 comprises:

an open loop estimator;
4 a closed loop estimator; and
a combiner communicatively coupled to said open loop estimator and a
6 open loop estimator.

108. The apparatus as claimed in claim 100, further comprising an outage
2 event detector communicatively coupled to said combiner.

20180121 21:20:00